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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/840,209	05/05/2004	Kang Lee	26048-019	7266

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MINTZ, LEVIN, COHN, FERRIS,  
GLOVSKY and POPEO, P.C.  
One Financial Center  
Boston, MA 02111

EXAMINER
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MAYO, TARA L

ART UNIT	PAPER NUMBER
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3671

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/840,209	LEE ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Tara L. Mayo	3671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-85 is/are pending in the application.
- 4a) Of the above claim(s) 1-55 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 56-85 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 May 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>07/23/04, 01/19/05</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of Group V in the reply filed on 15 March 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the spacer in the form of discrete rings as recited in claims 73 and 75 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

3. The drawings are objected to because the photographs shown in Figures 4 through 6 are poor quality. See 37 CFR 1.84(b).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must

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be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Specification*

4. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The abstract of the disclosure is objected to because it includes language that can be implied and refers to speculative applications.

On line 2, delete "is described."

Delete "The system will be useful. ... oil-and-gas exploration." on lines 6 through 8.

Correction is required. See MPEP § 608.01(b).

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 59, 74 and 77 through 79 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 59 recites the limitation "said insulator" on line 1. There is insufficient antecedent basis for this limitation in the claim. For the purpose of prosecution on the merits, the Examiner has considered the insulator to mean the aerogel material. Claim 74 is similarly rejected for the recitation of "the rings" on line 1. Claims 77 through 79 are each similarly rejected for the recitation of "the structure" each on line 1. Claims 74 and 77 through 79 have not been further prosecuted on the merits because the Examiner is unable to ascertain the scope of the claimed invention.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70, 71, 72, 76, 80, 81, 82 and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts, Jr. (U.S. Patent No. 4,037,626) in view of Frank et al. (U.S. Patent No. 6,887,563).

Roberts, Jr. '626, as best seen in Figure 2, shows a pipe-in-pipe apparatus comprising:  
with regard to claim 56,

a flow line (10);

at least one spacer (11) around the flow line; and

a carrier pipe (12) that is concentrically aligned with the flow line so as to create an annular space between the flow line and the carrier pipe, wherein the spacer is in said annular space;

with regard to claim 61,

wherein said spacer is ring shaped;

with regard to claim 68,

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wherein said spacer is in the form of helical coil (col. 3, lines 30 through 32);  
with regard to claim 70,

wherein said coil is in the form of a tube having a trapezoidal cross sectional shape;  
with regard to claim 71,

wherein the spacer is in the form of a tubular helical coil about the flow line (col. 3, lines 30 through 32), and the helical coil tube contains a vacuum capable of managing the temperature of the pipe-in-pipe apparatus; and  
with regard to claim 81,

wherein the spacer is made of an insulation material (col. 2, lines 47 through 61).

Roberts, Jr. '626 fails to teach:

an aerogel material within the annular space between the flow line and the carrier pipe;

the aerogel being a fiber reinforced material;

the aerogel comprising micro fibers;

the aerogel comprising a phase change material;

the aerogel being in particle form;

the spacer including an aerogel;

the aerogel being a silica aerogel;

the aerogel being in the form of one or more blankets;

the thermal conductivity of the aerogel being less than or equal to 20 mW/mK;

a thermal insulation strip between the spacer and the flow line;

the insulation strip comprising aerogel;



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the helical coil tube containing a heat-transfer medium comprising alcohol;  
the overall heat transfer value from the carrier pipe to the flow line being at most 5  
W/m<sup>2</sup>-°C; and  
temperature sensors.

Frank et al. '563 disclose an aerogel material for use in thermal insulation applications (col. 1, lines 10 through 15), wherein the aerogel is fiber reinforced (col. 3, lines 33 through 40), wherein the fiber reinforced material comprises micro fibers (col. 3, lines 55 through 56), wherein the aerogel comprising a phase change material (col. 4, lines 15 through 17), wherein the aerogel is in particle form (col. 4, lines 64 through 66), wherein the aerogel is a silica aerogel (col. 4, lines 15 through 17), wherein the aerogel is in the form of a blanket (col. 6, lines 15 through 19), and wherein the thermal conductivity of the aerogel is less than 20 mW/mK (col. 4, lines 27 through 29).

With regard to claims 56, 57, 58, 59, 60, 62, 63, 64, 80, 82, 84 and 85, it would have been obvious to one having ordinary skill in the art at the time of invention to modify the device shown by Roberts, Jr. '626 such that it would include an aerogel as taught by Frank et al. '563 in the annular space between the spacer and the flow line. The motivation would have been to thermally insulate the apparatus with a material having low thermal conductivity.

With specific regard to claims 65 through 67, the claimed limitation of a thermal insulation strip comprising aerogel positioned between the spacer and the flow line is met by

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combining the pipe-in-pipe apparatus of Roberts, Jr. '626 with the aerogel of Frank et al. '563 when the aerogel is positioned between the flow line and the spacer.

With specific regard to claim 72, the claimed limitation of the helical coil tube containing a heat transfer medium is met by combining the pipe-in-pipe apparatus of Roberts, Jr. '626 with the aerogel of Frank et al. '563. Specifically, the aerogel contains alcohol (col. 5, lines 28 and 29) and is positioned in the void formed between the helical coil tube and the flow line.

With regard to claim 76, while neither Roberts, Jr. '626 nor Frank et al. '563 teach the overall heat transfer value of the apparatus, it would have been obvious to one having ordinary skill in the art at the time of invention through routine experimentation and optimization to determine an optimal heat transfer value. The motivation would have been to limit the thermal conductivity of the apparatus as desired.

With regard to claim 83, the Examiner takes Official Notice of the use of temperature sensors for monitoring the temperatures of thermally sensitive materials.

11. Claims 56, 68 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ziemek et al. (U.S. Patent No. 4,570,678) in view of Frank et al. (U.S. Patent No. 6,887,563).

Ziemek et al. '678, as best seen in Figure 1, shows a pipe-in-pipe apparatus comprising:  
with regard to claim 56,

a flow line (1);

at least one spacer (3) around the flow line; and

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a carrier pipe (2) that is concentrically aligned with the flow line so as to create an annular space between the flow line and the carrier pipe, wherein the spacer is in said annular space;

with regard to claim 68,

wherein the spacer is in the form of a helical coil; and

with regard to claim 69,

wherein the spacer is in the form a solid rod (4x) having a circular cross section.

Ziemek et al. '678 fail to teach:

an aerogel material within the annular space between the flow line and the carrier pipe.

Frank et al. '563 disclose an aerogel material for use in thermal insulation applications (col. 1, lines 10 through 15).

With regard to claim 56, it would have been obvious to one having ordinary skill in the art at the time of invention to modify the device disclosed by Ziemek et al. '678 such that it would further include an aerogel material taught by Frank et al. '563. The motivation would have been to provide the apparatus with an insulator having low thermal conductivity.

12. Claims 56, 73 and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marchal (U.S. Patent No. 6,568,431) in view of Frank et al. (U.S. Patent No. 6,887,563).

Marchal '431, as best seen in Figure 3, shows a pipe-in-pipe apparatus comprising:

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with regard to claim 56,

a flow line (31);

at least one spacer (33) around the flow line; and

a carrier pipe (32) that is concentrically aligned with the flow line so as to create an annular space between the flow line and the carrier pipe, wherein the spacer is in said annular space;

with regard to claim 73,

wherein the spacer is in the form a discrete rings; and

with regard to claim 75,

wherein the rings are solid and have a circular cross section.

Marchal '431 fails to teach:

an aerogel material within the annular space between the flow line and the carrier pipe.

Frank et al. '563 disclose an aerogel material for use in thermal insulation applications (col. 1, lines 10 through 15).

With regard to claim 56, it would have been obvious to one having ordinary skill in the art at the time of invention to modify the device disclosed by Marchal '431 such that it would further include an aerogel material taught by Frank et al. '563. The motivation would have been to provide the apparatus with an insulator having low thermal conductivity.

***Conclusion***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Johnson et al. (U.S. Patent No. 4,237,023) teach the use of fumed silicon dioxide as a phase change material (col. 2, lines 36 through 49).

Ramamurthi et al. (U.S. Patent No. 5,306,555) teach various aerogel matrix composites.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tara L. Mayo whose telephone number is 571-272-6992. The examiner can normally be reached on Monday through Friday 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas B. Will can be reached on 571-272-6998. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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tlm

12 June 2006

  
**TARA L MAYO**  
**PATENT EXAMINER**